

SURFACE MOUNT MONOLITHIC CHIP CAPACITORS

HIGH DIELECTRIC CONSTANT TYPE

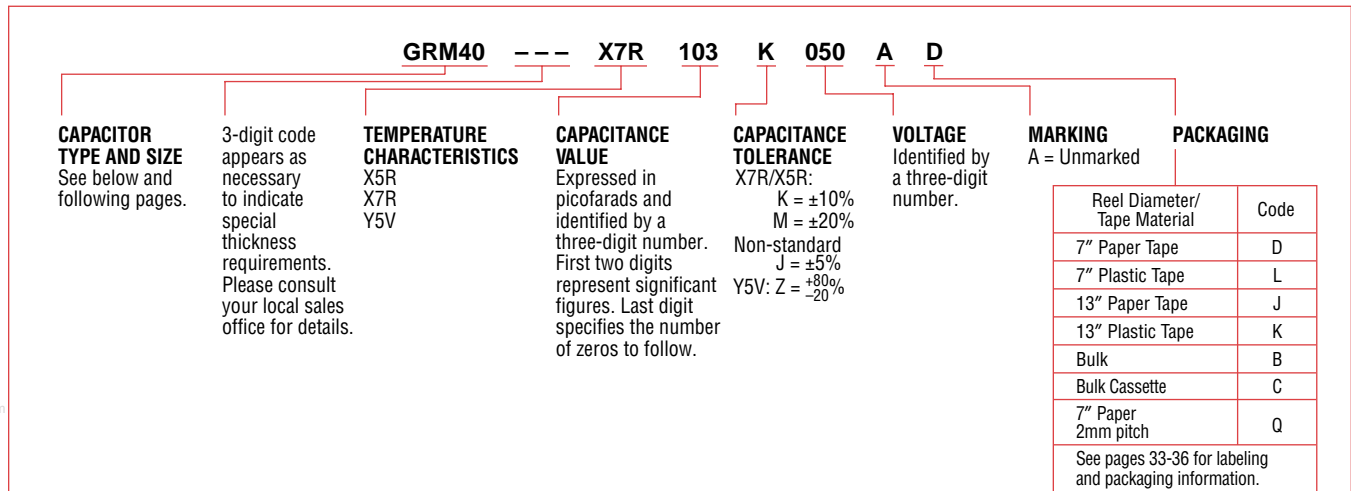
GRM36/39/40/42-6/42-2/43-2/44-1 Series



FEATURES

- Miniature size
- No Polarity
- Nickel Barrier Termination Standard – highly resistant to metal migration
- Uniform dimensions and configuration
- Suitable for reflow soldering
- GRM39, 40 and 42-6 suitable for wave soldering
- Minimum series inductance
- Tape and Reel Packaging
- Bulk Case Packaging available for GRM40 and smaller
- Wide selection of capacitance values and voltages
- Largest production capacity and volume in the world

PART NUMBERING SYSTEM

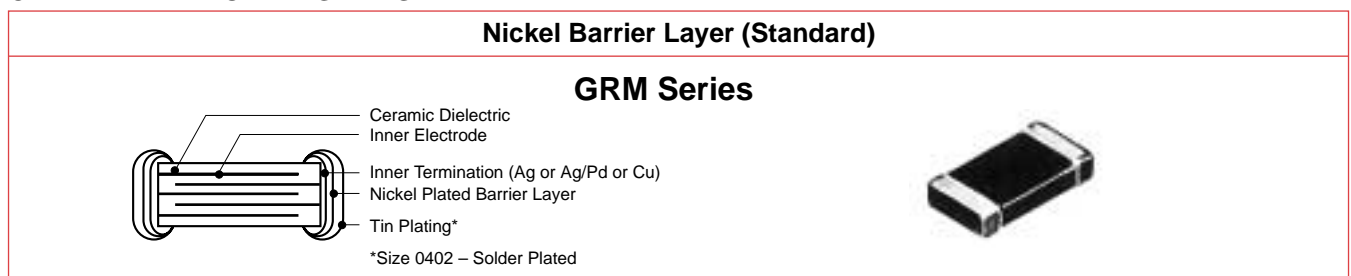


CHIP DIMENSIONS

Dimensions: mm	Size	EIA Code	L Length	W Width	T Thickness	e (min.) Termination	g (min.) Insulation
	GRM36	0402	1.0 ± 0.05	0.5 ± 0.05	0.5 ± 0.05	0.15 ~ 0.3	0.4
	GRM39*	0603	1.6 ± 0.1	0.8 ± 0.1	0.8 ± 0.1	0.2 ~ 0.5	0.5
	GRM40	0805	2.0 ± 0.1	1.25 ± 0.1	0.6 ± 0.1	0.2 ~ 0.7	0.7
					0.85 ± 0.1		
					1.25 ± 0.1		
	GRM42-6	1206	3.2 ± 0.15	1.6 ± 0.15	0.85 ± 0.1	0.3 ~ 0.8	1.5
					1.15 ± 0.1		
	GRM42-2	1210	3.2 ± 0.3	2.5 ± 0.2	1.6 ± 0.2	0.3 min.	1.0
					1.15 ± 0.1		
					1.35 ± 0.15		
1.8 ± 0.2							
GRM43-2	1812	4.5 ± 0.4	3.2 ± 0.3	2.0 max.	0.3 min.	2.0	
GRM44-1	2220	5.7 ± 0.4	5.0 ± 0.4	2.0 max.	0.3 min.	2.0	

*Bulk case packaging is L = 1.6 ± 0.07, W, T = 0.8 ± 0.07.

CHIP TERMINATION DIAGRAMS



All products on this page are available as standard through authorized Murata Electronics Distributors.

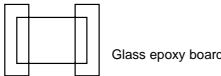
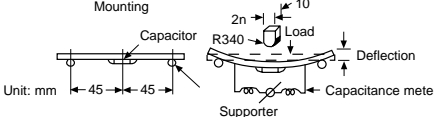
SURFACE MOUNT MONOLITHIC CHIP CAPACITORS HIGH DIELECTRIC CONSTANT TYPE- SPECIFICATION

GRM36/39/40/42-6/42-2/43-2/44-1 Series

GENERAL/ELECTRICAL

Capacitance Change with Temperature:	X5R: $\pm 15\% \Delta CX$ $-55^{\circ}C$ to $+85^{\circ}C$ X7R: $\pm 15\% \Delta CX$ $-55^{\circ}C$ to $+125^{\circ}C$ Y5V: $^{+22}_{-32}\% \Delta CX$ $-30^{\circ}C$ to $+85^{\circ}C$	Insulation Resistance (I.R.)	X5R/X7R 100,000 megohms or 1000 megohms-mfd (whichever is less) Y5V 10,000 megohms or 500 megohms-mfd (whichever is less)																				
Capacitance & D.F. (Frequency & Voltage)	X5R, X7R: 1kHz $\pm 100Hz$ @ 1.0 $\pm .2V_{rms}$ Y5V: 1kHz $\pm 100Hz$ @ 1.0 $\pm .2V_{rms}$	Dielectric Strength (Flash)	250% of rated voltage for 5 seconds with series resistor limiting charge current to 50mA max.; 200% for 500V																				
Dissipation Factor (D.F.)	<table border="1"> <tr> <td></td> <td>Min. 25V</td> <td>16V</td> <td>10V</td> <td>6.3V</td> </tr> <tr> <td>X5R</td> <td>2.5%</td> <td>3.5%</td> <td>3.5%</td> <td>5%</td> </tr> <tr> <td>X7R</td> <td>2.5%</td> <td>3.5%</td> <td>3.5%</td> <td>5%</td> </tr> <tr> <td>Y5V</td> <td>5.0%</td> <td>9.0%</td> <td>12.5%</td> <td>12.5%</td> </tr> </table>		Min. 25V	16V	10V	6.3V	X5R	2.5%	3.5%	3.5%	5%	X7R	2.5%	3.5%	3.5%	5%	Y5V	5.0%	9.0%	12.5%	12.5%	Typ. Aging (per Decade)	X5R/X7R 3% Y5V 7%
	Min. 25V	16V	10V	6.3V																			
X5R	2.5%	3.5%	3.5%	5%																			
X7R	2.5%	3.5%	3.5%	5%																			
Y5V	5.0%	9.0%	12.5%	12.5%																			

MECHANICAL

TEST	TEST METHOD	POST TEST LIMITS
Terminal Adhesion		<0603 1.0 lbs. \geq 0805 2.2 lbs. No evidence of termination peeling
Deflection		1 mm deflection (Glass epoxy board) No mechanical damage Cap., DF, IR meet initial limits
Solderability	MIL-STD-202 Method 208F	Meets Requirement For specific details contact factory

ENVIRONMENTAL

TEST	TEST METHOD	POST TEST LIMITS
Thermal Shock (Air to Air)	MIL-STD-202, Method 107, Condition A Prior to starting Thermal Shock test, capacitors shall be heat treated (deaged) for one (1) hour at $150^{\circ}C$. Allow capacitors to stabilize at room temperature for 48 hours prior to taking initial measurements. Post thermal Shock measurement shall be taken after 48 hours stabilization.	Appearance: No visual damage ΔC : X5R/X7R = $\pm 12.5\%$ Y5V = $\pm 30.0\%$ D.F.: X5R/X7R = 2.5% max. @ $25^{\circ}C$, (3.5% max. @ $25^{\circ}C$ for 16V & 10V Series) (7.5% max. @ $25^{\circ}C$ for 6.3V Series) Y5V = 5.0% max. @ $25^{\circ}C$, (9.0% max. @ $25^{\circ}C$ for 16V Series) (15% max. @ $25^{\circ}C$ for 10V & 6.3V Series) I.R.: X5R/X7R = 100,000M Ω min. of 1,000M $\Omega \cdot \mu F$ (whichever is less) Y5V = 10,000 Ω or 500M $\Omega \cdot \mu F$ min. (whichever is less)
Humidity, Steady State	Maintain the capacitor at $40 \pm 2^{\circ}C$ and 90 to 95% humidity for 500 ± 12 hours. Remove and let sit for 48 ± 4 hours at room temperature, then measure.	Appearance: No defects Capacitance: X5R, X7R within $\pm 12.5\%$; Z5U, Y5V within $\pm 30\%$ Q/D.F.: See chart below. I.R.: 1,000M Ω or 50 Ω F (whichever is less)
Humidity Load	Apply the rated voltage at $40 \pm 2^{\circ}C$ and 90 to 95% humidity for 500 ± 12 hours. Remove and let sit for 48 ± 4 hours at room temperature, then measure. The charge/discharge current is less than 50mA. • Initial measurement for Y5V/10V max. Apply the rated DC voltage for 1 hour at $40 \pm 2^{\circ}C$. Remove and let sit for 48 ± 4 hours at room temperature. Perform initial measurement.	Appearance: No defects Capacitance: X5R, X7R within $\pm 12.5\%$; Z5U within $\pm 30\%$; Y5V within $+30/-40\%$ (10Vmax), within $\pm 30\%$ (others)
Life Test	Apply 200% of rated voltage for 1000 ± 12 hours at maximum operating temperature; 150% for 500V Upon completion of above test wait 48 hours prior to performing post testing.	Appearance: No defects Capacitance: X5R/X7R $\pm 12.5\% \Delta CX$, Z5U/Y5V $\pm 30\% \Delta CX$ D.F.: X5R/X7R = 3.0% max. @ $25^{\circ}C$, (5% max. @ $25^{\circ}C$ for 16V & 10V Series) (7.5% max. @ $25^{\circ}C$ for 6.3V Series) Y5V = 7.5% max. @ $25^{\circ}C$, (10% max. @ $25^{\circ}C$ for 16V Series) (15% max. @ $25^{\circ}C$ for 10V & 6.3V Series) I.R.: X5R/X7R 1,000M Ω or 50M Ω -mfd. (whichever is less) Y5V 1,000M Ω or 50M Ω -mfd. (whichever is less) Flash: 250% rated voltage

	Char.	25V min.	16V	10V	6.3V
Q/D.F.	X5R	0.05 max.	0.05 max.	0.05 max.	0.075 max.
	X7R	0.05 max.	—	—	—
	Z5U	0.05 max.	—	—	—
	Y5V	0.075 max.	0.1 max. (C<1.0 μF) 0.125 max. (C \geq 1.0 μF)	0.15 max.	0.15 max.

I.R.: 500M Ω or 25 Ω F (whichever is less)
Dielectric Strength: No failure

